

OLIN CORPORATION
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
VOLATILE PETROLEUM HYDROCARBONS BY METHOD MADEP

OC-GW-IGR only

Reviewer/Date Tige Cunningham 6-18-10
Sr. Review/Date Chris Riccardi 6/25/10
Lab Report # TAL-Westfield 360-26874-1
Project # 6107100016-12

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? Yes ☒ No ☐ N/A ☐ Comments:
Check items received.

☒ Name of Laboratory ☒ Certification ID # ☒ Address ☒ Project ID ☒ Phone # ☒ Sample identification – Field and Laboratory
Client Information: ☒ Name ☒ Address ☒ Client Contact (IDs must be cross-referenced)

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement

Yes ☒ No ☐ N/A ☐ Comments:

Does the laboratory report include a completed Analytical Report Certification in the required format?

ACTION: If no, contact lab for submission of missing certification or certification with correct format.

1.3 Laboratory Case Narrative:

Yes ☒ No ☐ N/A ☐ Comments:

☒ Narrative serves as an exception report for the project and method QA/QC performance. ☒ Narrative includes an explanation of each discrepancy on the Certification Statement.

ACTION: If no, contact lab for submission of missing or illegible information.

1.4 Chain of Custody (COC)

Yes ☒ No ☐ N/A ☐ Comments:

Does the laboratory report include a copy of the completed Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of completed COC.

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1.5 Sample Receipt Information (Cooler Receipt Form): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory? Yes ☒ No ☐ N/A ☐ Comments:

- ☒ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).
☒ Container type noted ☒ Condition observed ☒ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used?

Yes ☒ No ☐ N/A ☐ Comments:

Water - 40 mL VOA vial/HCL to pH<2, cool to 4°C
Soil - 5 gram Encore™/cool to 4°C or 40 mL VOA vial with field preservation of sodium bisulfate (low-level) or methanol (high-level) or field preservation in water if soils are reactive to sodium bisulfate (i.e. alkaline conditions, excessive humic acid content, etc.)

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable); qualify both positive data and non-detect data (J) if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

ACTION: If each VOA vial for a sample contains air bubbles or the VOA vial analyzed contained air bubbles, flag positives (J) and reject nondetects (R).

1.5.2 Were all samples delivered to the laboratory without breakage? Yes ☒ No ☐ N/A ☐ Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes ☐ No ☒ N/A ☐ Comments:

1.6 Sample Results Section: Was the following information supplied in the laboratory report for each sample? Yes ☒ No ☐ N/A ☐ Comments:

- | | | | | | |
|--|--|--|---|--|---|
| <input checked="" type="checkbox"/> Field ID and Lab ID | <input checked="" type="checkbox"/> Date and time collected | <input checked="" type="checkbox"/> Analyst Initials | <input checked="" type="checkbox"/> Dilution Factor | <div style="border: 1px solid black; padding: 2px; display: inline-block;">N/A</div> | <input checked="" type="checkbox"/> Reporting limits |
| <input checked="" type="checkbox"/> Analysis method concentrations | <input checked="" type="checkbox"/> Preparation method | <input checked="" type="checkbox"/> Date of preparation/extraction/digestion clean-up and analysis, where applicable | | | <input checked="" type="checkbox"/> Matrix |
| | <input checked="" type="checkbox"/> Units (soils must be reported in dry weight) | | | | <input checked="" type="checkbox"/> Target analytes and |

ACTION: If no, contact lab for submission of missing or incomplete information.

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1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? Yes ☒ No ☐ N/A ☐ Comments:

☒ Method blank results ☒ LCS recoveries ☐ MS/MSD recoveries and RPDs ☒ Surrogate recoveries

Not collected

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded?

Yes ☐ No ☒ N/A ☐ Comments:

For water samples, the holding time is 7 days from sampling for unpreserved samples and 14 days for preserved samples.

For soil samples, methanol preservation required with a holding time of 14 days. If an Encore™ sampler was used, the lab must **preserve** the sample within 48 hours. Analytical holding time from time of preservation is 14 days.

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J). Use professional judgment to reject (R) data for grossly exceeded.

3.0 Laboratory Method

3.1 Was the correct laboratory method used?

Yes ☒ No ☐ N/A ☐ Comments:

Purge and Trap Water: 5030B Soil: 5035
Volatile Petroleum Hydrocarbons MADEP VPH 98-1

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

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3.2 Are the practical quantitation limits the same as those specified by the Yes ☒ No ☐ N/A ☐ Comments:
☒ SOW ☐ QAPP ☐ Lab ☐ MADEP

NOTE: The MADEP QA/QC Guidelines provides PQLs for volatile petroleum hydrocarbons. See MADEP PQLs vs. the PQLs listed in the QAPP.

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? Yes ☒ No ☐ N/A ☐ Comments:

NOTE: The MADEP QA/QC Guidelines requires a minimum compound reporting list for volatile organic compounds.

3.4 If dilutions were required, were dilution factors reported? Yes ☒ No ☐ N/A ☐ Comments:

NOTE: MADEP guidance states that if a diluted and an undiluted analysis is performed, the laboratory should report results for the lowest dilution within the valid calibration range for each analyte.

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Are the Method Blank Summaries present? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analytical batch of 20 samples or less? Yes ☒ No ☐ N/A ☐ Comments:

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ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See attached table for PQLs).

Yes ☒ No ☐ N/A ☐ Comments:

4.4 Do any method blanks have positive results for VPH parameters? Qualify data according to the following:

Yes ☐ No ☒ N/A ☐ Comments:

For VPH contaminants:

Review blank and sample chromatograms to evaluate the nature of the detection in the blank and associated samples. Use professional judgment. The following actions may be applied:

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed..

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = $10 \times$ or $5 \times$ blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: Call laboratory for LCS form submittal. If data are not available, reject (R) data associated with that batch.

5.2 Is a LCS Summary Form present? Yes ☒ No ☐ N/A ☐ Comments:

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ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of control limits?

Yes ☐ No ☒ N/A ☐ Comments:

NOTE: A full target, second source LCS is required by MADEP.

NOTE: MADEP guidelines list LCS recovery limits as 70-130 except for naphthalene. The laboratory must identify any other analytes that routinely exceed 70-130 percent.

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit but > 10%, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, positive and non-detect results are rejected (R) unless the QC limit for that compound is below 10% (flag as above).

5.4 Are 80% of LCS recoveries within laboratory control limits?

Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If 80% of LCS recoveries are not within limits, use professional judgment and consult Senior Chemist. If more than half of the recoveries are above control limits, qualify all positive results as (J). If more than half of the recoveries are below control limits, batch may require rejection and reanalysis

6.0 **Matrix Spikes**

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

ACTION: If no, contact senior chemist to see if any were specified.

Yes ☐ No ☒ N/A ☐ Comments:

6.2 Is the MS/MSD Recovery Form present?

ACTION: If no, contact lab for resubmission of missing data.

Yes ☐ No ☐ N/A ☒ Comments:

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

Yes ☐ No ☐ N/A ☒ Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission.

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6.4 Are any VPH spike recoveries outside of the QC limits?

Yes ☐ No ☐ N/A ☒ Comments:

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$

Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

NOTE: A full target, second source MS/MSD is required by MADEP.

NOTE: MADEP guidelines list MS/MSD recovery limits as 70-130 except for naphthalene.

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits?

Yes ☐ No ☐ N/A ☒ Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$

Where: S = MS sample result
D = MSD sample result

NOTE: MADEP guidelines list MS/MSD RPD limits for both water and soils as ≤ 50 .

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

7.0 Surrogate Recoveries

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Were VPH surrogate recoveries outside of laboratory limits for any sample or method blank? If yes, were samples re-analyzed? Yes ☐ No ☒ N/A ☐ Comments:

NOTE: $\%R = QD \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: MADEP guidelines list surrogate limits for both water and soils as 70-130% for both detectors.

ACTION: If recoveries are >10%, but fail to meet QC criteria: (1) For recoveries below the QC limit, qualify non-detects and positives (J), and (2) For recoveries above the QC limit, qualify only positives (J). If any surrogate recovery is <10% (unless the QC limits are below 10%, in which case, results are flagged as stated above), flag positives (J) and reject nondetects (R).

NOTE: If surrogate recoveries fail due to dilution, results are not flagged. Document on checklist and in the case narrative.

8.0 Sampling Accuracy

8.1 Were trip blanks shipped with VOC samples and analyzed?

Yes ☐ No ☒ N/A ☐ Comments:

NOTE: MADEP requires trip blanks per the following frequency:

	<u>Soil/Sediment</u>	<u>Aqueous</u>	<u>Drinking Water</u>
Option 1	Not Required	Not Required	1 per cooler VOAs/VPH
Option 3	1 per 10 samples	1 per 10 samples	1 per 10 samples

8.2 Do any trip blanks have positive results?

Yes ☐ No ☐ N/A ☒ Comments:

ACTION: Prepare a list of samples shipped in the same cooler as the contaminated blank.

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ACTION: Evaluate trip blank results against method blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to the table below.

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

8.3 Were ambient blanks shipped with VPH samples and analyzed?

NOTE: MADEP requires ambient (field) blanks per the following frequency:

	<u>Soil/Sediment</u>	<u>Aqueous</u>	<u>Drinking Water</u>
Option 1	Not Required	Not Required	Not Required
Option 3	1 per 10 samples	1 per 10 samples	1 per 10 samples

Yes ☐ No ☒ N/A ☒ Comments: TC

8.4 Do any ambient blanks have positive results?

Yes ☐ No ☐ N/A ☒ Comments:

ACTION: Prepare a list of samples associated with the contaminated blank (all collected from the site on that day).

ACTION: Evaluate ambient blank results against method and trip blank results to determine if contaminant may be laboratory- and/or shipment-derived. If results are not lab- and/or shipment-related, qualify according to the table above (8.2).

8.5 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

Yes ☐ No ☒ N/A ☐ Comments:

NOTE: MADEP does not specify the collection of rinsate blanks.

8.6 Do any rinsate blanks have positive results?

Yes ☐ No ☐ N/A ☒ Comments:

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-, ambient-, or shipment-derived. If results are not lab-, ambient-, or shipment-related, qualify according to the table above (8.2).

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9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes ☐

No ☒

N/A ☐

Comments:

9.2 Were field duplicates collected per the required frequency?

Yes ☐

No ☐

N/A ☒

Comments:

☐ SOW ☐ QAPP ☐ MADEP Option 1 (1 per 20) ☐ MADEP Option 3 (1 per 10)

9.3 Was the RPD \leq 50% for soils or waters? Calculate the RPD for all results and attach to this review.

Yes ☐

No ☐

N/A ☒

Comments:

ACTION: RPD must be \leq 50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes ☐

No ☒

N/A ☐

Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999.

Massachusetts Department of Environmental Protection (MADEP), 1998. "Method for the Determination of Volatile Petroleum Hydrocarbons (VPH)"; Division of Environmental Analysis; Office of Research and Standards; Bureau of Waste Site Cleanup; January 1998.